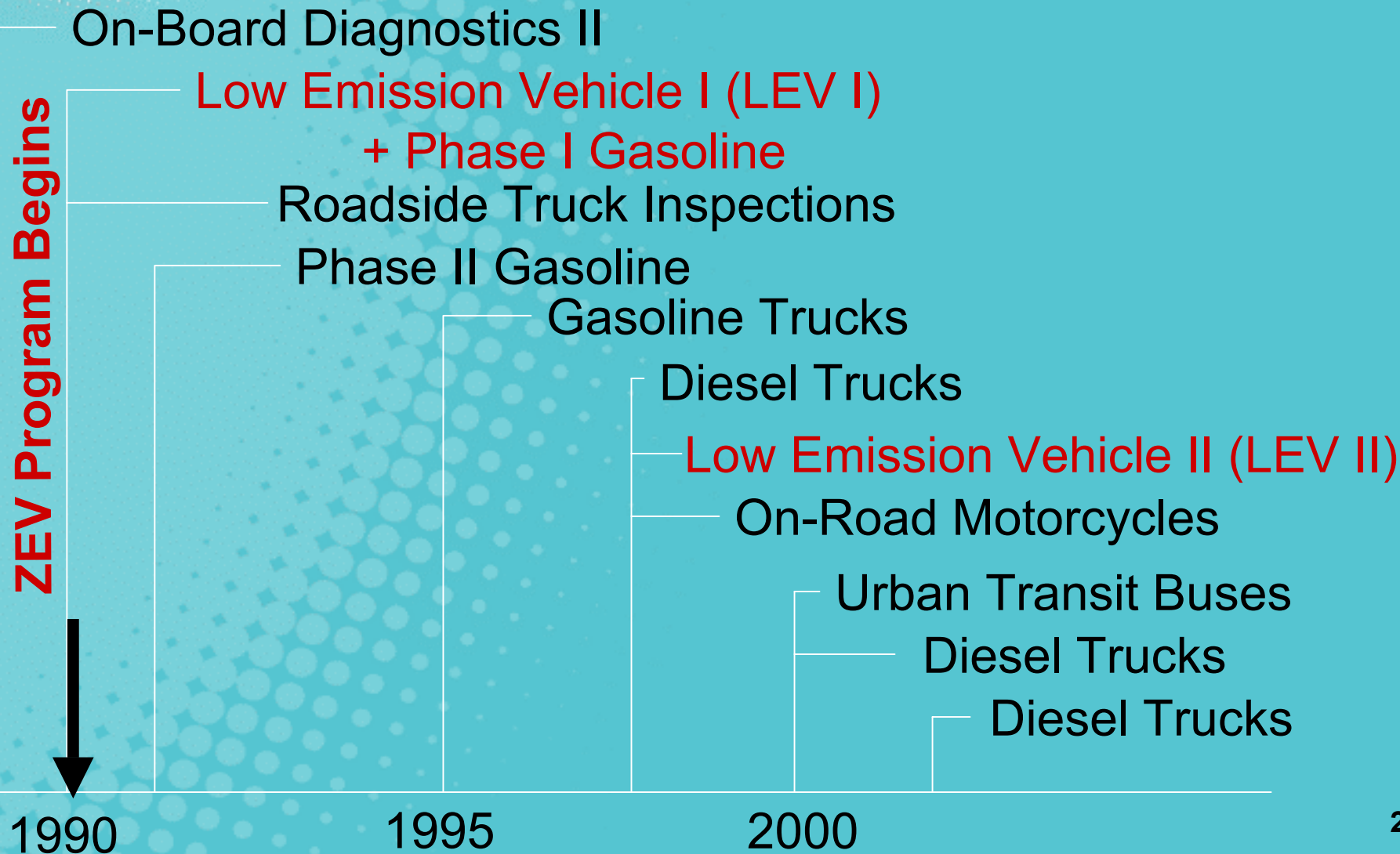


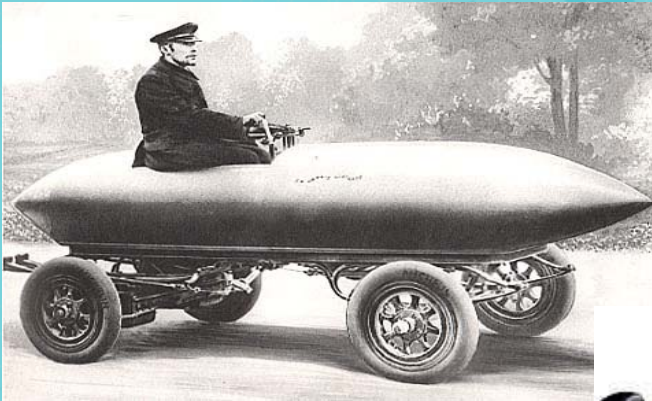
Overview

- The challenge
- **ZEV program history & technology story**
- The 2003 regulation
- ARB's role in bringing ZEVs to commercialization
- Section 177 States
- Next steps
- Conclusion

Key Motor Vehicle Regulations



The Technology Development Story



Paul MacCready & AeroVironment

- 1977-1979 Achieves human powered flight
- 1981 Achieves solar electric flight
- 1982 Builds Sunraycer solar EV for GM
- 1988 Proposes Project Santana to GM, a highly-efficient lead-acid battery EV
...they bite, and budget \$3M
- 1989 Santana (Impact/ EV1) tested at GM proving grounds in Arizona



1990: “Roger and Us”

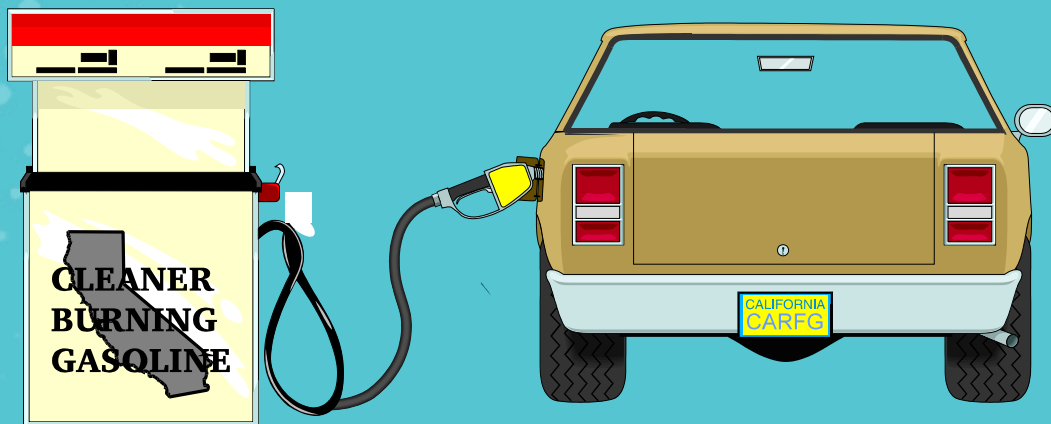
- **January 1990 GM Chairman Roger Smith announces the Impact (EV1) electric vehicle at the Los Angeles Auto Show**
- **The Impact (EV1) becomes one of the most publicized concept cars that GM ever (had) built**
- **Earth Day 1990- Roger Smith announces that GM will put the Impact (EV1) into production**

1990: ARB LEV I

- Declining fleet average requirement
- Included Clean Fuel Outlet program
- Initial ZEV requirement
- Full implementation by 2003

Motor Vehicle Fuels Control Strategy

- **Treat vehicles / fuels as a system**
 - Vehicle emission standards
 - Fuel standards
 - Include lubricants
- **Flexible**



1990: ZEV Requirements

- Located within LEV I in section 1960.1 (g) (2) as footnote (5) to a table for “Fleet Average NMOG Exhaust Emission Standards for LDV Weight Classes 7-10”, it said:
“While meeting the fleet average standards, each manufacturer’s sales fleet shall be composed of at least 2% ZEVs in the model years 1998 through 2000, 5% ZEVs in 2001 and 2002, and 10% ZEVs in 2003 and subsequent.”
- Entire ZEV regulation was only a few sentences

1990: ZEV Requirements

- Other elements:
 - Intermediate manufacturers exempt until 2003
 - **Biennial reviews**
 - Regulatory flexibility
(e.g. trading, banking)

1990: ZEV Program Rationale

- Projected improvements in conventional technology not sufficient to meet air quality standards
 - Substantial portion of the fleet had to emit “zero” (clean California power plant levels)
- ZEVs avoid ICE vehicle emissions performance deterioration with age